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(12) **United States Patent**  
Winter et al.

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(54) **SINGLE DOMAIN LIGANDS, RECEPTORS  
COMPRISING SAID LIGANDS, METHODS  
FOR THEIR PRODUCTION, AND USE OF  
SAID LIGANDS AND RECEPTORS**

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#### (56) References Cited

##### U.S. PATENT DOCUMENTS

4,356,270 A	10/1982	Itakura
4,642,334 A	2/1987	Moore et al.
4,656,134 A	4/1987	Ringold
4,683,195 A	7/1987	Mullis et al.
4,683,202 A	7/1987	Mullis
4,704,692 A	11/1987	Ladner
4,711,845 A	12/1987	Gelfand et al.
4,714,681 A	12/1987	Reading
4,800,159 A	1/1989	Mullis et al.
4,806,471 A	2/1989	Molin et al.
4,816,397 A	3/1989	Boss et al.
4,889,818 A	12/1989	Gelfand et al.
4,937,193 A	6/1990	Hinchliffe et al.

(List continued on next page.)

##### FOREIGN PATENT DOCUMENTS

CA	2016841	11/1990
CA	2019323	12/1990
EP	A 0 120 694	10/1984

EP	A 0 125 023	11/1984
EP	0 194 276 B1	9/1986
EP	A 0 200 362	12/1986
EP	0 201 184 B1	12/1986
EP	A 0 239 400	9/1987
WO	WP 86/01533	3/1986
WO	WO 87/02671	5/1987

(List continued on next page.)

#### OTHER PUBLICATIONS

Inbar et al., PNAS-USA, 69, 2659-2662, 1972.  
Amit et al., Science, 233, 747-753, 1986.  
Satow et al., J. Mol. Biol. 190, 593-604, 1986.  
Colman et al., Nature, 326, 358-363, 1987.  
Sheriff et al., PNAS-USA, 84, 8075-8079, 1987.  
Padlin et al., PNAS-USA, 86, 5938-5942, 1989.  
Skerra and Plückthun, Science, 240, 1038-1041, 1988.  
Bird et al., Science, 242, 423-426, 1988.  
Huston et al., PNAS-USA, 85, 5879-5883, 1988.  
Porter et al., J. Cell. Physiology, 67, 51-64, 1966.  
Jaton et al., Biochemistry, 7, 4185-4195, 1968.  
Rockey, J., J. Exp. Med., 125, 249-275, 1967.  
Stevenson, Biochem. J., 133, 827-836, 1973.  
Edmundson et al., Biochemistry, 14, 3953-3961, 1975.  
Rossman et al., Nature, 317, 145-153, 1985.  
Saiki et al., Science, 230, 1350-1354, 1985.  
Larrick, et al., Biochem. Biophys. Res. Comm., 160,  
1250-1265, 1989.  
Orlandi et al., PNAS-USA, 86, 3833, 1989.  
Yon and Fried, Nuc. Acids, Res. 17, 4895, 1989.  
Fields and Song, Nature, 340, 245-246, 1989.  
Baldwin and Schultz, Science, 245, 1104-1107, 1989.  
Menard et al., Cancer Res., 43, 1295-1300, 1983.  
Bosslet et al., Eur. J. Nuc. Med., 14, 523-528, 1988.  
Bosslet et al., Cancer Immunol. Immunother., 23, 185-191,  
1986.  
Bremer et al., J. Biol. Chem., 259, 14773-14777, 1984.  
Griffiths & Milstein, Hybridoma Technology in the Bio-  
sciences and Medicine, 103-115, 1985.  
Jones et al., Nature, 321, 522-525, 1986.  
Zoller & Smith, Nuc. Acids Res., 10, 6487-6500, 1982.  
Carter et al., Nuc. Acids Res., 13, 4431-4443, 1985.  
Sanger et al., PNAS-USA, 74, 5463-5467, 1977.  
Yannisch-Perron et al., Gene, 33, 103-119, 1985.  
Riechmann et al., Nature, 332, 323-327, 1988.

(List continued on next page.)

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#### (57) ABSTRACT

The present invention relates to single domain ligands derived from molecules in the immunoglobulin (Ig) superfamily, receptors comprising at least one such ligand, methods for cloning, amplifying and expressing DNA sequences encoding such ligands, preferably using the polymerase chain reaction, methods for the use of said DNA sequences in the production of Ig-type molecules and said ligands or receptors, and the use of said ligands or receptors in therapy, diagnosis or catalysis.

2 Claims, 23 Drawing Sheets